Calcule as integrais dos exercícios 1 a 24.

1. $\displaystyle\int \operatorname{sen} 3x \cos 3x \; dx$

9. $\displaystyle\int \frac{x}{\sqrt{x-1}} \; dx$

17. $\displaystyle\int \sec x \tan x \; dx$

2. $\displaystyle\int \operatorname{sen} \theta \cos^3 \theta \; d\theta$

10. $\displaystyle\int x(1+x)^{\frac{4}{3}} \; dx$

18. $\displaystyle\int \tan x \; dx$

3. $\displaystyle\int \frac{\arctan x}{1+x^2} \; dx$

11. $\displaystyle\int \frac{\cos x}{4 + \operatorname{sen}^2 x} \; dx$

19. $\displaystyle\int \cot x \; dx$

4. $\displaystyle\int \frac{dx}{\sqrt{x}\,(1+\sqrt{x})^2}$

12. $\displaystyle\int \tan^2 x \; dx$

20. $\displaystyle\int \frac{e^x}{\cos^2(e^x - 2)} \; dx$

5. $\displaystyle\int \frac{dx}{4 + 3x^2}$

13. $\displaystyle\int \frac{\operatorname{sen} 2x}{3 + \cos 2x} \; dx$

21. $\displaystyle\int \frac{\operatorname{sen} \sqrt{x}}{\sqrt{x}\sqrt{\cos^3 \sqrt{x}}} \; dx$

6. $\displaystyle\int \frac{x}{\sqrt{1-x^4}} \; dx$

14. $\displaystyle\int \frac{dx}{x \ln \sqrt{x}}$

22. $\displaystyle\int \frac{18 \tan^2 x \sec^2 x}{(2 + \tan^3 x)^2} \; dx$

7. $\displaystyle\int \frac{y}{(3y-4)^3} \; dy$

15. $\displaystyle\int 3^x e^x \; dx$

23. $\displaystyle\int \frac{\cos(\ln x)}{x} \; dx$

8. $\displaystyle\int \frac{dt}{t^2 + 2t + 2}$

16. $\displaystyle\int \frac{e^x}{\sqrt{1 - e^{2x}}} \; dx$

24. $\displaystyle\int \frac{dx}{\sqrt{1 - 4x^2}}$

25. Encontre a expressão que define a função f, cujo gráfico contém o ponto $\left(0, \frac{8}{3}\right)$ e cuja derivada é $f'(x) = x\sqrt{1 - x^2}$.

Resolva os problemas de valor inicial dos exercícios 26 a 29.

26. $\begin{cases} \dfrac{dy}{dx} = \dfrac{x}{\sqrt{2x^2+1}} \\ y(0) = 1 \end{cases}$

28. $\begin{cases} \dfrac{dy}{dx} = \dfrac{e^{1/x}}{x^2} \\ y(1) = 0 \end{cases}$

27. $\begin{cases} y' = \dfrac{x}{2x^2 + e^2} \\ y(0) = 1 \end{cases}$

29. $\begin{cases} f'(x) = \left(1 - \operatorname{sen}^2 x\right) \operatorname{sen} 2x \\ f\left(\frac{\pi}{2}\right) = 0 \end{cases}$

Resolva as integrais definidas dos exercícios 30 a 37.

30. $\displaystyle\int_2^3 \frac{x}{\sqrt{x-1}} \; dx$

33. $\displaystyle\int_1^e \frac{dx}{x\left(1 + \ln^2 x\right)} \; dx$

36. $\displaystyle\int_0^{\frac{\pi}{4}} \left(1 + e^{\tan x}\right) \sec^2 x \; dx$

31. $\displaystyle\int_1^2 \frac{e^x}{e^x + e} \; dx$

34. $\displaystyle\int_0^{\frac{1}{2}} \frac{x}{\sqrt{1 - x^4}} \; dx$

37. $\displaystyle\int_{\ln \frac{\pi}{6}}^{\ln \frac{\pi}{2}} 2e^x \cos(e^x) \; dx$

32. $\displaystyle\int_0^{\sqrt{\ln \pi}} 2x e^{x^2} \cos\left(e^{x^2}\right) \; dx$

35. $\displaystyle\int_0^{\frac{\pi}{2}} e^{\operatorname{sen} x} \cos x \; dx$

RESPOSTAS

1. $\frac{1}{6}\left(\operatorname{sen}3x\right)^2+C$

2. $-\frac{\cos^4\theta}{4}+C$

3. $\frac{1}{2}\left(\arctan x\right)^2+C$

4. $\frac{-2}{1+\sqrt{x}}+C$

5. $\frac{\sqrt{3}}{6}\arctan\frac{\sqrt{3}\,x}{2}+C$

6. $\frac{1}{2}\operatorname{arcsen}x^2+C$

7. $\frac{2-3y}{9(3y-4)^2}+C$

8. $\arctan(t+1)+C$

9. $\frac{2}{3}\sqrt{(x-1)^3}+2\sqrt{x-1}+C$

10. $\frac{3(1+x)^{\frac{10}{3}}}{10}-\frac{3(1+x)^{\frac{7}{3}}}{7}+C$

11. $\frac{1}{2}\arctan\left(\frac{1}{2}\operatorname{sen}x\right)+C$

12. $-x+\tan x+C$

13. $-\frac{1}{2}\ln|3+\cos2x|+C$

14. $2\ln|\ln\sqrt{x}|+C$

15. $\frac{3^x e^x}{1+\ln3}+C$

16. $\operatorname{arcsen}e^x+C$

17. $\sec x+C$

18. $\ln|\sec x|+C$

19. $-\ln|\csc x|+C$

20. $\tan(e^x-2)+C$

21. $4\left(\cos\sqrt{x}\right)^{-\frac{1}{2}}+C$

22. $-\frac{6}{2+\tan^3x}+C$

23. $\operatorname{sen}(\ln x)+C$

24. $\frac{1}{2}\operatorname{arcsen}(2x)+C$

25. $f(x)=-\frac{1}{3}\sqrt{(1-x^2)^3}+3$

26. $y=\frac{1}{2}\sqrt{2x^2+1}+\frac{1}{2}$

27. $y=\frac{1}{4}\ln\left(2x^2+e^2\right)+\frac{1}{2}$

28. $y=-e^{\frac{1}{x}}+e$

29. $f(x)=\operatorname{sen}^2x-\frac{1}{2}\operatorname{sen}^4x-\frac{1}{2}$

30. $\frac{10\sqrt{2}-8}{3}$

31. $\ln\left(\frac{e+1}{2}\right)$

32. $-\operatorname{sen}(1)$

33. $\frac{\pi}{4}$

34. $\frac{1}{2}\operatorname{arcsen}\left(\frac{1}{4}\right)$

35. e^{-1}

36. e

37. 1